

SECTION – SPORT SCIENCE

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SELECTED PSYCHOLOGICAL DETERMINANTS OF PHYSICAL ACTIVITY AMONG WOMEN WITH METABOLIC SYNDROME

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- A. Study design/planning
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Abstract:

Aim. The aim of the study was to show the dominant types of physical activity and their causes in patients with metabolic syndrome undertaking regular and sporadic physical activity, as well as to determine whether their sporting activities are related to the sense of efficacy and life satisfaction.

Materials and methods. Forty-one women diagnosed with metabolic syndrome were tested, 20 regularly (on average, 6.48 hours a week allocated to sports) and 21 sporadically practicing sports (the average number of hours devoted to physical activity in this group is 1.25). The author's "Active Lifestyle", SWLS Satisfaction with Life Scale and the GSES Generalised Self Efficacy Scale in Juczyński's adaptation were used.

Results. Patients with metabolic syndrome undertake physical activity, mainly on their own initiative, to improve their health. In this group, walking and aerobics were the most popular. The respondents were characterized by an average sense of efficacy. The level of life satisfaction is higher in the group of subjects regularly practicing sports. Regularly performing sport is accompanied by patients with metabolic syndrome having greater satisfaction with ($r = 0.311^*$, $p = 0.047$).

Conclusions. Regular physical activity of patients with metabolic syndrome is associated with life satisfaction. Therefore, physical activity should be clearly promoted in obese patients (patients) with metabolic disorders.

Introduction

Obesity is defined as excess fat accumulation resulting in a risk to health. The main cause of overweightness and obesity is a positive energy balance. Consumption exceeds energy expenditure over a longer period of time, and consequently, body mass increases with accumulation of subcutaneous and visceral fat. Obesity is complex. It consists of genetic factors, diet and lifestyle. According to data from WHO, in 2006, 1.6 billion people in the world were overweight and 400 million were obese. It is a forecast that by 2015, the number of overweight

and obese individuals will double [1]. Obesity contributes to the occurrence of cardiovascular diseases [2], type 2 diabetes [3], hypertension, dyslipidaemia, liver diseases [4] and cancer [5, 6]. Obesity leads to adipose tissue dysfunction, insulin and leptin resistance. There is an excess of free fatty acids and pro-inflammatory adipokines in systemic circulation. Long-term obesity results in lipotoxicity, chronic inflammation, hypertension, atherosclerosis and cardiovascular diseases [7]. Each of the metabolic syndrome factors initiates other ones, multiplying the risk of morbidity and mortality. The leading risk factors for cardiovascular disease are abdominal

obesity, dyslipidaemia, hyperglycaemia and hypertension [8]. People with metabolic syndrome have a 3- to 4-fold higher risk of developing type 2 diabetes [9] and a 2- to 3-fold higher risk of cardiovascular morbidity and mortality [10, 11].

To determine the metabolic syndrome, at least three of the following criteria must be met: increased waist circumference - in the European population: ≥ 80 cm in women, and ≥ 94 cm in men; triglyceride concentration > 150 mg/dl (1.7 mmol/l) or treatment of hypertriglyceridemia; HDL C < 50 mg/dL (1.3 mmol/L) - in women, and < 40 mg/dL (1.0 mmol/L) - in men, or treatment of this lipid disorder; systolic blood pressure ≥ 130 mm Hg or diastolic blood pressure ≥ 85 mm Hg, or treatment of previously diagnosed hypertension; fasting plasma glucose ≥ 100 mg/dl (5.6 mmol/l) or pharmacological treatment of type 2 diabetes; abdominal obesity WC for women ≥ 80 cm WC.

New universal criteria for the recognition of metabolic syndrome were proposed in 2005 by experts from the International Diabetes Federation (IDF) [12]. The listed organisations agree that the main components of the metabolic syndrome are obesity, insulin resistance, dyslipidaemia and hypertension. The term metabolic syndrome (MS) defines the coexistence of related metabolic risk factors conducive to the development of atherosclerotic cardiovascular disease and type 2 diabetes [13].

Taking the negative consequences of metabolic syndrome on the functioning of the body into account, the introduction of preventive measures seems to be key. Thus, the role of undertaking physical activity by persons suffering from metabolic syndrome is indisputable. Body composition and physical fitness are beneficial. They cause positive psychological effects by increasing quality of life, reducing the risk of cardiovascular disease (which is very likely to occur in the case of low physical activity), metabolism, and helping maintain energy balance [14]. According to Nazar [14], in middle-aged women metabolic syndrome, it was observed that moderate (but regular) physical effort for 6 months, caused a reduction in waist circumference, a decrease in blood pressure and beneficial changes in the structure and function of the heart. In other studies, it has been shown that regularly-training individuals have a reduced fasting blood insulin level, low density lipoprotein (LDL) and some markers of inflammation, as well as blood pressure and reduced blood pressure [14]. Frequent physical activity also improves coordination and, importantly, has a positive effect on patients' mood; reducing the level of anxiety while increasing the level of self-esteem. As shown by Hen et al. [15], regular physical activity causes beneficial modifications of lipid metabolism parameter profiles, which leads to a decrease in the waist circumference of people with metabolic syndrome, also

reducing the severity of chronic low inflammation activity, ALT and AST activity, therefore, positively affecting liver function.

Purpose of research

The aim of the study was to demonstrate relationships between physical activity and selected psychological features such as sense of effectiveness and life satisfaction in patients with metabolic syndrome.

The following detailed research questions were posed:

1. What are the dominant forms of physical activity in the studied patients with metabolic syndrome?
2. What was the decisive factor for undertaking physical activity by the studied women with metabolic syndrome?
3. Are there differences in sense of effectiveness among women with metabolic syndrome, regularly and sporadically undertaking physical activity?
4. Are there differences in the level of life satisfaction among women with metabolic syndrome, regularly and sporadically undertaking physical activity?

Materials and methods

Forty-one women diagnosed with metabolic syndrome were examined. Obese patients with metabolic syndrome confirmed by laboratory and clinical tests were selected for the study. The subjects were Kraków residents. Twenty of them declared that they regularly engaged in physical activity, and twenty-one stated lack of or sporadic physical activity. Persons qualified for the research provided answers regarding their physical activity.

On this basis, two groups were distinguished. Therefore, the selection for study groups was deliberate [16]. The average age of the women who did not practice any sports or practiced them sporadically was 35.15 years. Differentiation was observed within the group by age - standard deviation (SD)=9.28. The average number of hours allocated to physical activity in this group per week was 1.25 hours (SD=0.96). For the group declaring physical activity, the average age of the subjects was 36.62 years. The group was diverse in this respect - SD=12.11. The women from this group devoted an average of 6.48 hours per week to physical activity (SD=3.5).

The "Active Lifestyle" survey designed by the authors was used, which allowed to determine how often, in what form and for what reasons the subjects undertook physical activity; The Satisfaction with Life Scale (SWLS) is a useful tool designed to measure life satisfaction, with regard to his/her current life and the Generalised Self-Efficacy Scale in Juczyński's adaptation [17]. This scale "measures the strength of an individual's general

belief in the effectiveness of dealing with difficult situations and obstacles” [17, p. 97].

Statistical analysis was performed using the STATISTICA version 13 statistical package. Using the Shapiro-Wilk test, it was examined whether the distribution of results of the examined variables were close to normal distribution. The obtained results indicated that the distributions of the examined variables in the groups did not differ significantly from normal distribution, therefore, a decision was made to use the following parametric tests: Student’s *t*-test for dependent variables, Pearson’s *r* correlation coefficient test.

Results

As it can be seen in Table 1 presented below, among the studied patients with metabolic syndrome, the most common form of physical activity was walking (48.78%) and “aerobics”, understood here as organised group classes at fitness clubs (36.58%). Regularly exercising women prefer aerobics (52.38%), the gym (42.86%) and walking (33.33%) and “other undefined activities”

(33.33%). People who engage in physical activity sporadically, primarily walk (60%). Going to the gym or swimming was undertaken by 25% of people from this group.

Statistical differences were found for two types of physical activity: aerobics (Test *T* = 0.03 at *p* = 0.05) and walking (Test *T* = 0.04 at *p* = 0.05). Other types of activity did not differentiate the subjects from neither of the groups.

Analysing the reason for taking up physical activity by the studied patients (Table 2), it can be stated that the majority of women (68.29%) exercise for health reasons. Physical activity “for health” is the dominant motive for both exercising sporadically and regularly (in this group, caring for appearance thanks to regular movement is also important - 52.38%).

When asked about the source of motivation to undertake physical activity by the studied patients, it is clear that they train mainly on their own initiative (73.17%). Their “own desire” to participate in various forms of physical activity was the reason for 80.98% of those exercising regularly and for 65% of those exercising sporadically. It is worth noting that among women who

Table 1. Sport disciplines performed by patients with metabolic syndrome (%)

	Sports discipline								
	Aerobics	Walking	Swimming	Skiing	Tennis	Gym	Roller-blading	Cycling	Other
Regularly exercising	52.38	33.33	19.05	14.28	9.52	42.86	19.05	28.57	33.33
Sporadically or not exercising	20	65	25	5	0	25	15	10	0
Total	36.58	48.78	21.95	9.76	4.88	34.15	17.07	19.51	17.07

Table 2. Reasons for undertaking physical activity by patients with metabolic syndrome (%)

Reason for undertaking physical activity	Appearance	Health	Fashion	Other
	Regularly exercising	52.38	76.19	0
Sporadically or not exercising	15	60	5	10
Total	34.15	68.29	2.43	19.51

Table 3. Source of motivation for undertaking physical activity by patients with metabolic syndrome (%)

Who encouraged me to undertake physical activity	Own desire	Friend	Media	I have been practicing sport since childhood	Other
	Regularly exercising	80.95	19.05	0	23.81
Sporadically or not exercising	65	15	5	0	0
Total	73.17	17.07	2.43	12.19	2.43

regularly practice sports, as much as 23.81% have been associated with it since childhood (this can be seen in Table 3). The latter reason differentiates subjects in both groups (T test = 0.03 at $p = 0.01$).

The results of analysis carried out using the Student's t test (Table 4) did not show statistically significant differences between women practicing sport and those non-practicing ($p > 0.05$) in terms of self-efficacy and satisfaction with life.

It is worth noting, however, that in relation to norms, results in terms of self-efficacy for both women undertaking physical activity regularly and sporadically, are at the upper limit of the average result (7 stens) [17]. However, the average result in the area of life satisfaction for women not undertaking physical activity is 4 stens - this means a low level of satisfaction. On the other hand, women practicing sport are characterized by an average level of life satisfaction (5 stens) [17].

The results of Pearson's r test showed statistically significant, positive, average correlations between the number of hours spent on training during the week and life satisfaction (Table 5). This means that people who spend more time on physical activity, derive more satisfaction from life. This is confirmed by the analysis of the mean, higher values regarding this variable for life

satisfaction in the exercisers (mean=22.52) compared to those who did not undertake exercise (mean=20.5). There were no significant correlations between the remaining variables ($p > 0.05$).

Discussion

The research allowed to answer the posed research questions. First of all, it turned out that both patients with metabolic syndrome undertaking physical activity regularly and sporadically exercise primarily for health-related reasons. Subjects regularly exercising also emphasised the impact of movement on physical appearance. People with obesity often consume low-calorie nutritional products. The consequence of using this type of diet is to reduce the amount of fat in the body [14]. Another result is the loss of lean body mass - mainly muscle. As a result of muscle-wasting, quality of life deteriorates, therefore, it seems extremely important to undertake physical activity while using low-calorie diets in patients with obesity (and metabolic syndrome) [14]. Physical activity is a form of physical rehabilitation in patients with metabolic syndrome, which improves insulin resistance and metabolic control. It also improves lipid profile [18], causes weight reduction, and thus, counter-

Table 4. Descriptive statistics and results of the Student's t -test - age, sense of self-efficacy and life satisfaction for people practicing and not practicing sports

	Group				Student's t -test	
	Not practicing sport		Practicing sport		t	p
	mean	SD	mean	SD		
Age	35.15	9.28	36.62	12.11	-0.434	0.666
Generalised Self-Efficacy (GSES)	31.00	4.98	31.52	3.63	-0.386	0.702
Satisfaction with Life (SWLS)	20.50	5.39	22.52	4.95	-1.254	0.217

Table 5. Results of the Pearson's r correlation coefficient test - age, sense of self-efficacy and satisfaction with the number of hours devoted to physical activity per week

		Age	Generalised Self-Efficacy (GSES)	Satisfaction with Life (SWLS)	Number of hours per week
		r	r	r	r
Age	r	1	-0.005	-0.214	-0.082
	p		0.974	0.159	0.612
Generalised Self-Efficacy (GSES)	r	-0.005	1	0.262	0.026
	p	0.974		0.083	0.870
Satisfaction with Life (SWLS)	r	-0.214	0.262	1	0.311*
	p	0.159	0.083		0.047
Number of hours devoted to training per week	r	-0.082	0.026	0.311*	1
	p	0.612	0.870	0.047	

* Correlation significant at the level of 0.05 (two-way).

acts the cardiovascular complications of diabetes. It also has a positive effect on muscle flexibility and strength [19]. Therefore, it is an important source of prevention and therapy for obesity [20]. Similar benefits from undertaking physical activity by both people with metabolic syndrome and those healthy were observed in Brazilian studies by Ciolac and Guimarães [21].

The studied women preferred walking, aerobics, the gym or swimming pool, i.e. forms of activity widely available in a metropolitan environment, where there are plenty of places for walks, fitness clubs and swimming pools. Patients rarely playing sports, definitely most frequently walk. There are certainly benefits from this form of activity, but it seems that organised classes under the guidance of a professional instructor, probably more regular ones, would be most recommended. According to Yang [22], referring to studies among people with metabolic syndrome in Korea, it is recommended to undertake moderate aerobic physical activity for more than 30 minutes at least 5 or more days a week to treat or prevent metabolic syndrome (in the case of healthy people). However, the type of physical activity and its intensity must be individually tailored to the patient's needs [23].

What is beneficial, however, is that most of the subjects exercise (regularly or sporadically) on their own accord, guided by internal motivation. The surveyed people who played sports in their childhood are still physically active despite their metabolic syndrome.

Analysing the correlations between self-efficacy and undertaking physical activity, no statistically significant differences were found between regular and sporadic exercisers. However, the surveyed women were charac-

terized by an average (and upper range) level of sense of efficacy. In research, it is shown that there is a relationship between self-efficacy and undertaking pro-health behaviours by people with metabolic syndrome [24].

Very interesting relationships were observed in terms of satisfaction with life in the subjects exercising regularly and irregularly. The occurrence of metabolic syndrome and resulting medical problems may contribute to the subjective perception of lower satisfaction with life by patients [25]. At the same time, life satisfaction and social support network are factors that reduce the risk of metabolic syndrome [26]. It turned out that among the examined patients who do sports regularly, the level of life satisfaction was significantly higher compared to people exercising irregularly. This means that patients playing sports will be characterised by better well-being, greater well-being and probably better social and professional functioning. There are clear psychological benefits of physical activity. These include: reducing the risk of depression, prolonging patients' lives and improving their quality [19]. The need to promote an active lifestyle in patients with metabolic syndrome is therefore clearly evident. The importance of increasing social awareness through preventive measures in people with metabolic syndrome was also emphasized by Janszky [27].

Conclusion: Regular physical activity is related to the life satisfaction of patients with metabolic syndrome.

Practical implications: Physical activity should be clearly promoted in obese patients (patients) with metabolic disorders.

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